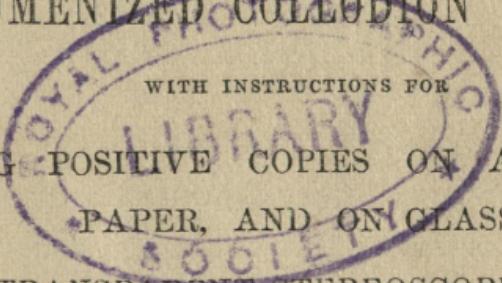


THE
Photographic Tourist,

CONTAINING
FULL AND CONCISE DIRECTIONS FOR THE
PRODUCTION OF
LANDSCAPES & STEREOSCOPIC VIEWS

BY THE

ALBUMENIZED COLEODION PROCESS,

WITH INSTRUCTIONS FOR
PRINTING POSITIVE COPIES ON ALBUMENIZED
PAPER, AND ON GLASS
FOR TRANSPARENT STEREOSCOPIC VIEWS;

ALSO FOR THE PRODUCTION OF
MAGIC LANTERN SLIDERS.

PUBLISHED BY FREDERICK COX,
Optician & Manufacturer of Photographic Apparatus,
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Introduction.

THE many various processes that have been recommended as preservative, or dry collodion, have been merely the different hobbies of practical photographers, but, except in the hands of a skilful adept, not successful with the general amateur, who has but little time to overcome the difficulties that surround him. In the manipulation described in the following pages, the writer does not claim the merit of originality, except in a few details; but he has so worked them practically that they may be depended on, as containing sufficient authority for the most inexperienced, to produce, in the space of a few days' practice, pictures that will bear comparison with many that have been taken by other processes after months of study. The Dry Collodion process here described, is in substance the same as published by him eighteen months since, but the most difficult and intricate portions of that process have either been modified or omitted, so that the amateur will, it is hoped, readily understand, and successfully carry out the remaining portions.

In giving directions for Stereoscopic pictures, the union of simplicity and perspecuity has been attempted, it is hoped with success; in fact, it will be found that the production of these charming double-pictures involve no more mechanical difficulties than that involved in ordinary landscapes, while the portability of the

apparatus renders it within the means of those to whom a load of thirty pounds would be a serious inconvenience, if not an entire prohibition.

In enumerating the different apparatus required, it is to be understood that some few of the articles described may be omitted from the absolute necessaries, but they all will be found positively useful, and that in so many ways as to render it advisable to have them in readiness. To those who may be disposed to turn their attention to this subject, and have any doubt as to their being able to succeed, practical instruction may be had at my establishment, where I have erected a glass room, and can guarantee to perfect, in two lessons, any person who has a slight knowledge of photography, and which, with a few days practice, will be found sufficient.

For those who object to the trouble of preparing the glass plates themselves, we can supply them, either ready sensitive for the camera, or merely albumenized only. All the solutions required are also kept in stock fit for immediate use.

I have also re-written the directions for printing paper pictures, and the process here given, although but slightly different from that described in my former work, "The Compendium of Photography," is much more certain in obtaining a pleasant warm tone, and the permanence of the picture is, as far as I have tried it, very satisfactory.

Apparatus.

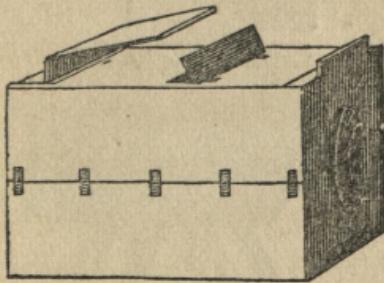


Figure 1.

FOR ordinary landscapes the folding camera, *Fig. 1.*, is recommended ; it possesses the advantage of extreme portability and durability. The sides of the camera are jointed, to enable it to fold flat, and pack inside a portmanteau ; the dark slides for the collodion plate and the focussing screen together only forming a package three inches thick. Where it is required to use a double combination lens for taking portraits as well as landscapes, a camera with a sliding and folding body is recommended : these are quite as portable as the plain folding cameras, and possess the advantage of suiting lenses of different focal lengths.

For the production of stereoscopic pictures, the model camera, *Fig. 2*, will be found far the most convenient: the camera, lens, six or nine dark slides as required, the top of the stand, and focussing screen, packing into a box 11-in. by 9-in., and 7-in. thick, the whole of which will weigh under 14 pounds.

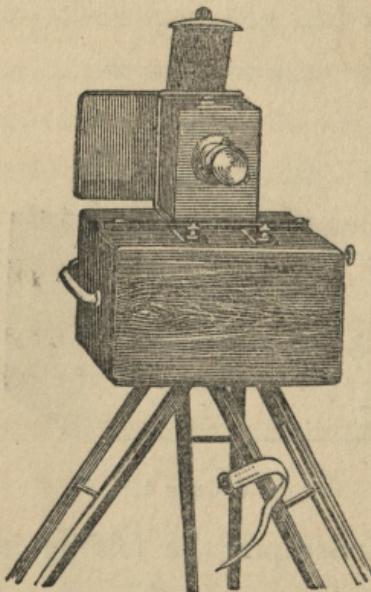


Figure 2.

When required for use, the camera is taken out of the case and slipped on a dove-tail groove outside the box, which thus forms the table; on the top of this box, but underneath the camera, are two parallel laths, which turn on a pivot at one end, the other end is fastened to the bottom of the camera; by this means the camera may be moved from side to side without altering the position of the image on the ground glass of the camera. The prepared plates are inserted into the dark slides

previous to leaving home, and thus each is used as required.

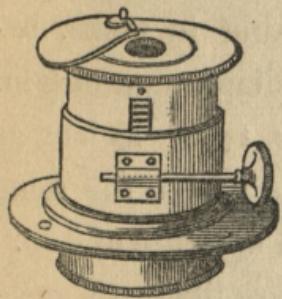


Figure 3.

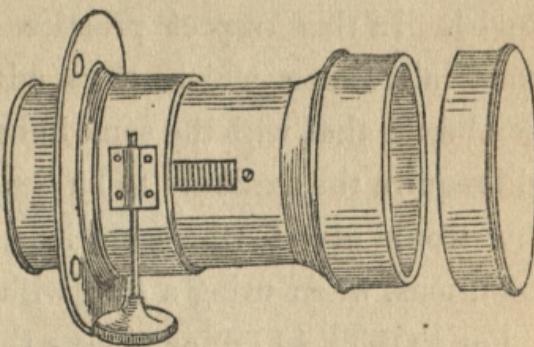


Figure 4.

For LANDSCAPES, the lens recommended is the *single achromatic*, *Fig. 3*, mounted either with rack and pinion adjustments, or with sliding tubes. In using lenses of this description it will be requisite to employ a stop or diaphragm, to curtail the amount of light. As many operators are not aware on what principle to regulate the different size stops, it will be advisable to remember that the smaller the aperture the longer will be the exposure in the camera of the sensitive plate, but at the same time the picture will be improved in definition, and objects at different distances from the camera will be more in focus. For example, fit your camera on the stand, and insert a diaphragm of $\frac{3}{4}$ -in. diameter, and focus for an object, say ten yards off, at the same time observing the appearance of another object at twenty yards distance; then alter the diaphragm to one of $\frac{1}{2}$ -in. aperture, when both the objects will be sharper and better defined than either of them were

before ; but in a dull light, or in photographing a subject with dark shadows, the larger size stops must be employed. In this respect practice will alone teach the exact allowance which it is advisable to make, remembering that with the same light a diaphragm of $\frac{1}{2}$ -in. will require the exposure to be nearly twice as long as you would give to the same lens, and under the same conditions, when using a stop with an aperture of $\frac{3}{4}$ -in.

For PORTRAITS, or objects that are likely to move their position, the double combination achromatic lenses, *Fig. 4*, are indispensable ; they consist of a set of four glasses, adapted to each other, and produce pictures in less than half the time required for the single achromatic. In taking groups of men or animals in the shade, no stop will be required, but if there is a strong glare, or the objects are in the direct sunshine, a slight curtailment will be advisable. If required, most lenses of this description can be made to adapt for landscapes or views, at a slight additional cost ; to do this, you unscrew the lens from the camera, and remove the brass cell containing the two back lenses : these are not required at all, and should be carefully placed to protect them from injury. Then screw the brass mounting back into the flange that is fixed on the front of the camera ; having done this, unscrew the large brass hood that is in the front of the lens, and reverse the front lens in its mounting, so as to place the flat side of the glass outside or next the view : then place a diaphragm in

the hood of brass work, and it is ready for use. Of course, before you wish to photograph a living object, you will replace the glasses as they were before. Many a lense has been condemned as worthless because the glasses have been improperly placed in their mountings.

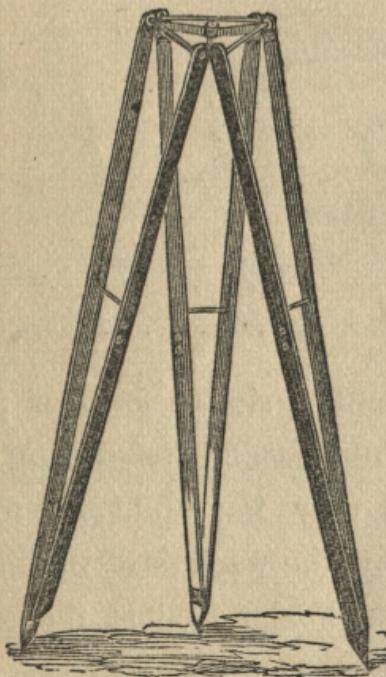


Figure 5.

For supporting the camera, a stand will be required ; the most convenient to the tourist will be one as described in *Fig. 5.* The legs unslip from the top, and strap together. If required, they can be had jointed ; this will improve their portability, but necessarily weaken them in a slight degree.

To prevent the annoyance and trouble of unpacking camera and fitting it on the stand, in order to determine if a view which presents itself is suitable for the

camera at command, a small instrument, called a Visnometer, is extremely convenient, it folds for the waistcoat pocket, and shows how much of a given view will fall on the ground glass of the camera.

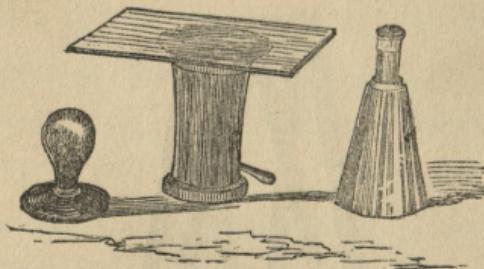


Figure 6. Figure 7. Figure 8.

Fig. 6 represents a simple form of plate holder, to hold the plate whilst cleaning or pouring on the albumen coating, (as it is very important not to let the glass become heated by the warmth of the hand;) by gently pressing the plate holder against the glass, the air is expelled from the concave surface, and the plate adheres firmly. For large plates the lever holder, *fig. 7*, is recommended.

A focussing glass, *fig. 8*, is used for obtaining a clear and sharp definition on the ground glass of the camera which cannot well be obtained without the use of this little instrument.

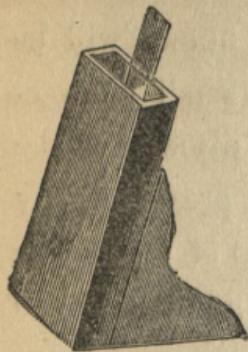


Figure 9.

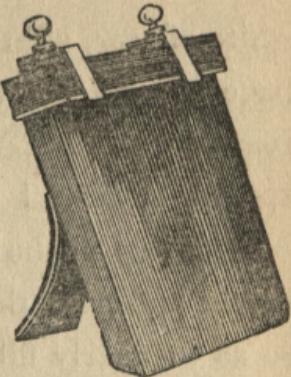


Figure 10.

*Figs. 9 and 10 represent two forms of dipping baths, these I recommend to be made of gutta percha; the ordinary form, *fig. 9*, is all that is required for home use, but for travelling, the addition of an air-tight top, as shown in *fig. 10*, is preferable, it enables the solution to be carried about without the trouble of returning it to the bottle; in all cases, however, the silver must occasionally be filtered. There is a dipper supplied to lay the plate on previous to immersion, and which also forms the means for withdrawing it again when required.*

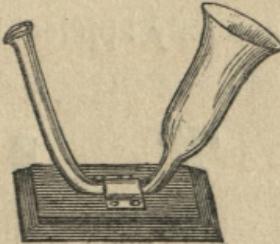


Figure 11.

Albumen filter,—this most important instrument was recommended by Mr. Crooks, and will be found the means of simplifying the filtering of the albumen. The

white of egg, after having been iodized, as described at page 23, and filtered through a common funnel, will be ready for use. To use it—first take a small piece of sponge and well wash the same, then place it in the bottom part of the large end of the filter, press it lightly down, and pour the albumen on the top of the sponge so as to nearly fill the glass; in a few minutes it will percolate through the sponge and rise in the small tube, from which it is to be poured on the plate; after the albumen has spread evenly over the surface of the wet collodion, the superfluous quantity may be drained back into the large bell mouth end of the filter, and it is again ready for use.

A visnometer is a small instrument extremely useful to the tourist when either out for the purpose of photography or merely on a ramble; it consists of a tin case, something like a stereoscope, and is for determining if a view or scene is applicable for photography—without setting up his camera he will at once see how much of the landscape he will obtain on his focus screen; of course these instruments are only applicable for the lens they are made to suit.

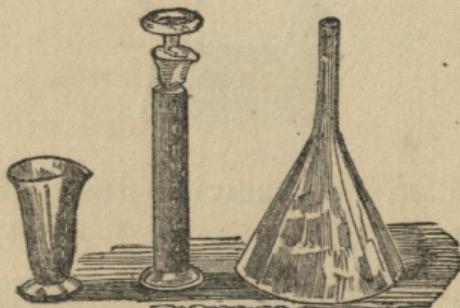


Fig. 12.

Fig. 13.

Fig. 14.

A glass measure, *fig. 12*, is useful not only for measuring quantities of different fluids employed, but also for containing the developing solution when in use; having a convenient spout, the solution may be poured from them on the plate more readily than from a bottle.

Fig. 13 represents a collodion bottle. As collodion constantly is depositing a small portion of sediment, it is advisable to keep the bulk of your stock in a large bottle, pouring off just sufficient to use into a long bottle, as represented above, by this means small specks and streaks in the film are prevented.

A glass funnel, *fig. 14*, is used for filtering as well as decanting solutions; two or three will be required to use for different solutions.

A set of scales and weights is necessary in making the solutions; they should have glass pans, and are supplied with weights up to two drachms, the pans must be kept scrupulously clean; it will be better to weigh the chemicals in a small piece of paper to prevent contamination, placing a piece the same size in the opposite scale to counterpoise the weight.

For developing the picture a levelling stand is required; by means of three screws underneath, the plate is levelled, and then the solution poured over it. Instead of this, many operators use a glass dish. See development, page 29.

Porcelain pans are useful in the printing of positives from the glass negatives; their use will be found described in the directions given for this process.

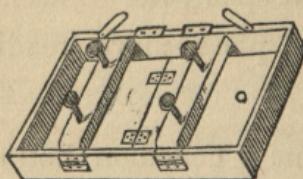


Figure 15.

Pressure frames, *fig. 15*, are for the purpose of obtaining positive copies from the glass negatives; one made with a jointed back is recommended.

Chemicals.

The chemicals required by the tourist will be better purchased in their pure state than manufactured by him, still as there may be a difficulty with some of the solutions, a few hints will be acceptable.

The best collodion for the dry process is made as follows:—Take two ounces of ether and three drachms of alcohol, to which had six grains of gun-cotton, by frequently shaking the bottle the cotton will readily dissolve, then add two drops of chloroform, keep this in a stoppered bottle, and mark it “Plain Collodion.” In another bottle make a solution of iodide of ammonium thirty grains, alcohol one ounce; mark this “Iodizing solution.”

When wanted for use, mix one drachm of iodizing solution with seven drachms of plain collodion, shake the bottle well up, and add one grain of iodine, not more, let the whole stand to settle for twelve hours, and the clear portion may be poured off fit for use; this collodion will be about the colour of port wine, and will remain good for the dry process any length of time.

NITRATE OF SILVER that has been fused at a low temperature is recommended for making the exciting bath, in its absence the ordinary crystallized silver may be employed; for the printing process the crystal

silver answers equally as well as that which has been fused.

BROMIDE and IODIDE of POTASSIUM are used in preparing the iodized albumen, a small portion of free iodine is also recommended, but it must be cautiously used.

GLACIAL ACETIC ACID is a chemical that must be used particularly pure to succeed well, as it plays a very important part in keeping the picture clean and free from stains; to test this acid dissolve a few crystals of nitrate of silver in two or three drops of water, and add it to a drachm of the glacial acid, the mixture should preserve its brightness even when exposed to the light.

KAOLIN or China clay is useful in restoring the colour of the silver bath, as nitrate of silver rapidly becomes discoloured by the immersion of the albumenized plate; a small portion of this earth should be kept in the bottom of the bottle, it will by this means purify the bath and prevent the solution getting so dark as to affect the picture.

GALLIC ACID is the best agent for developing the picture, its action is not so rapid as the pyrogallic acid, but the results are more satisfactory, the pictures being cleaner.

HYPO-SULPHITE OF SODA is the best fixing agent I have yet employed for this process, it does not

act so quickly as the cyanide of potassium, but the film being tough the iodide of silver is generally rather difficult to remove, and I have found cyanide injure the depth of the picture before it had accomplished its work, therefore I should give the preference to the soda.

In the printing process soda is used to a great extent, and I will here caution the amateur to keep the measures and pans that are used for this chemical entirely separate from those used for the other solutions.

CHLORIDE OF GOLD is always to be used in toning paper pictures, as permanence cannot be secured without it; this salt is likewise frequently adulterated, and hence many disappointments arise.

In filtering solutions, &c., use pure filtering paper; the best description is sold in packets of a hundred circles; by folding the circle into four it will fit the funnel, and the solution will percolate through; for other purposes such as draining the plates on, &c., that sold in sheets under the name of bibulous is preferable.

Dry Collodion Process,

NEGATIVES BY ALBUMENIZED COLLODION.

THIS beautiful process, first published by Dr. Taupenot¹ in the Autumn of 1855, possesses many advantages over any other preservative method that has yet been known ; its extraordinary amount of detail, and certainty of success, has, to a very considerable extent, led to its popularity. Since it was originally given to the world, there have been many modifications, which have added to the simplicity, and now I can guarantee to perfect any amateur in three or four hours to secure nine or ten good pictures from a dozen plates.

The whole process, for convenience, we will divide into eight operations, viz. :—

1st—Cleaning the Plate.

2nd—Coating with Collodion.

3rd—Sensitize the Collodion Coating.

4th—Coating with Albumen.

5th—Exciting the Albumen Solution.

6th—Exposure in the Camera.

7th—Developing.

8th—Fixing.

CLEANING THE GLASS.

This is, in all the branches of Photography, one of the most important points, and which by beginners is not carefully considered ; but as the film, after having been dried twice, and again moistened to develope, has an inclination to rise in blisters, especial care should be taken to have as pure and clear a surface as possible. The best method of cleaning glass is that recommended by Mr. FISHER, of Yarmouth. He says, " Having selected a piece of glass free from blemishes, proceed to clean them, by washing with water in which a little cyanide of potassium has been dissolved : this is to free them from all traces of grease. They should afterwards be well rinsed in some clean water, and wiped dry with a linen cloth : then mark one side, and rub it well with a small bung or cork, using a mixture of tripoli, nitric acid, and water, say—

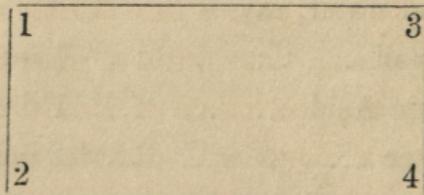
Tripoli ...	...	...	...	$\frac{1}{4}$ ounce.
Nitric Acid ...	...	...	...	1 drachm.
Water ...	..	...	...	2 ounces.

rinse it again in clean water, and wipe it dry ; then lay it face upwards on a flat board and polish well with a wash leather that has been washed, to free it from the dressing used in the manufacture. By breathing on the glass the surface may be more readily seen, and if any smears are visible, wash and clean the glass again, but on no account touch the surface with the hand after it has

been polished. The readiest way will be to clean a stock before commencing operations, and stand them by in a plate box until required."

COATING THE PLATE WITH COLLODION.

The best collodion for this purpose is one that, when dry, presents a fine granular surface, and not glutinous or reticulated ; as the sensitiveness of the collodion is not a matter of any moment, the old useless negative collodion may generally be used, but in default of this, use a thin iodized collodion, in which a slight quantity of iodine has been added. The publisher of this work prepares a collodion for this purpose. To pour the collodion on to the surface of the clean plate, proceed as follows :—Hold the glass plate between the fore-finger and thumb of the left hand, by the corner marked No. 1.



Then pour on the centre of the plate a sufficiency of collodion, letting it run towards the corner marked No. 2, slant the plate so as to cover the end of the glass towards No. 1, taking care to avoid the thumb : then incline the plate so as to cover No. 3, and finally drain off the superfluous quantity at corner No. 4, returning it into the bottle. Whilst the plate is draining it must be kept

vertical, and a slight rocking motion should be given to it to prevent the waves or lines that otherwise would be formed. When the plate has had time to drain it is to be immersed in the nitrate of silver bath, in order to

SENSITIZE THE COLLODION COATING.

This bath is to be made by dissolving the nitrate of silver in distilled water.

Solution A.

Fused nitrate of silver.	8 drachms.
Distilled water ...	2 $\frac{3}{4}$ ounces.

Let this thoroughly dissolve. Then mix,

Solution B.

Iodide of potassium ...	4 grains.
Distilled water ...	2 drachms.

When this is dissolved, pour it into the silver solution A stirring it the whole time with a glass rod, to insure perfect mixing ; the precipitate of iodide of silver that was at first thrown down will almost immediately redissolve, and the solution will be at once perfectly bright and clear ; then add—

Distilled Water ...	12 ounces.
Alcohol ...	1 drachm.
Ether ...	1 , ,

Shake it well up and filter, to clear it from the fine precipitate which is again formed, when it will require to

be filtered two or three times through the *same* filtering paper: afterwards add—

Glacial acetic acid ... $\frac{1}{2}$ ounce.
Kaolin 3 drachms.

Keep this solution in a stoppered bottle.

When required for use, filter a sufficient quantity into a gutta percha dipping bath, *Fig. 9*, and the same is ready for use. The glass plate that has been coated with collodion is to be laid face upwards on the dipper, which is supplied with the trough, and immerse steadily into the solution, where it should remain from one to two minutes, or until the greasy appearance is removed; to facilitate this, after it has been immersed, say half a minute, raise it up and down two or three times. This will have the effect of evaporating the ether much quicker, and producing a more even film. If the proper precautions have been taken, the plate at this period presents a clear blue-white semi-opaque appearance, something resembling ivory. It then should be removed, holding the glass between the fore-finger and thumb by the corner it was previously held by whilst coating with collodion, and just resting for a minute the corner marked No. 4 on several thicknesses of blotting paper; lay it on a levelling stand, and pour over the surface a good stream of pure soft water for several minutes, in order to remove the nitrate of silver solution; this requires to be very carefully and thoroughly done,

or marks will be left in the film. Drain off the water, and it is then ready for the fourth operation, viz:—

COATING WITH ALBUMEN.

Iodized albumen is best prepared by mixing albumen with glycerine, and the bromide and iodide of potassium, and perhaps the most simple method will be to proceed by taking two *new-laid* eggs, and carefully separating the yolk from the white, which only is to be retained ; this will be found to measure about two ounces, and should be put into a small basin or measure, and well beaten into a froth with a silver fork or bundle of quills. Then pour it into a 4-ounce bottle, where it should rest a few minutes to allow the froth partially to subside, and add to the albumen the following :—

Distilled Water	...	2 drachms.
Iodide of potassium	...	8 grains.
Bromide of potassium.		2 grains.
Pure iodine	...	$\frac{1}{2}$ grain.

These are to be dissolved in the water in the order given, taking especial care not to add too much free iodine, or it will coagulate the albumen. Pour this iodizing solution into the albumen, and shake it well up for two or three minutes, afterwards add :—

Glacial acetic acid	...	...	6 drops,
Glycerine	...	...	1 drachm.

Again shake it well, and after it has been filtered it is

ready for use. As albumen is too thick and glutinous to pass through filtering paper, a small piece of sponge will be a convenient substitute. Lightly press a small fragment into the neck of a glass funnel, and let the albumen filter through it several times, until it is perfectly clear and limpid. Do not press the sponge too tight into the funnel, or it will prevent the albumen running through. Having prepared this solution, take the moist plate that has been removed from the sensitive bath, and pour over the surface, in the same manner as the collodion, the iodized albumen, using the instrument *Fig. 11*; it should be poured over several times, in order to get an equal film, free from dust or air bubbles. They are then to be carefully dried in a room free from dust. In drying the plates, let them stand on several sheets of clean blotting paper, with the top of the plate touching the wall only at one corner. When they are *thoroughly dry* they may be stored in plate boxes ready for the next operation. Up to this point they will bear exposure to daylight without injury, therefore these operations may be conducted in any room where there is not a great excess of light.

When required for use, they are to have the

ALBUMEN COATING EXCITED

by immersion in the aceto-nitrate bath, as before used for exciting the collodion film, see page 21. The plate

will require to remain in this bath for about one minute, when it must be withdrawn, and again placed on a levelling stand ; the screws underneath are to be carefully adjusted so as to procure a level surface, and a small quantity of distilled water poured over the surface, after which, a much larger quantity of common soft or rain water is to be used, in order to remove all trace of nitrate of silver : unless this is well and carefully done the plates will, to a certainty, be spoiled. The deposits of nitrate of silver that are formed in drying, produce a number of marks or feathers, which appear afterwards in developing the picture, therefore the water should be poured not only over the centre of the plate, but also round the sides and in the corners : when this is done, stand the plate in a dark cupboard or box to dry, using the same precautions as before, to prevent the plate touching the wall except at the top corner. When the plates are dry they are to be stored away in a *dark box* for use. As they are now sensitive to light, care must be taken to preserve them from exposure to it ; the safest plan is to keep them in tin plate boxes, which are perfectly impervious to light, and do not injure the plates by vapour, which most wood boxes will do if they are kept any length of time.

EXPOSURE IN THE CAMERA.

The plates may be exposed either immediately they are dry, or kept two, or three weeks, if required.

The form of instrument most suited to the purpose having been selected, see page 5, the focus is to be obtained on the ground glass, by moving the lens either backwards or forwards until the greatest amount of distinctness is obtained, and then the dark frame containing the prepared plate is to be inserted : the wood slide or shutter to be raised, and a dark cloth thrown over the camera, to guard against any light reaching the plate except that which passes through the lens. Next remove the brass cap or shutter of the lens, and expose the plate to the action of the luminous ray. The time of exposure is not an object of so much importance, as the time of development may be suited to rectify any little error, but as a general rule about double the time required for wet collodion negatives will be found sufficient, that is with a stereoscopic lens of $4\frac{1}{2}$ -in. focus, and a $\frac{1}{4}$ -in. stop in the shade about two minutes and a half to three minutes ; but in the sunshine, half, or even a third of this time will be ample. Again, with a lens of 14-in. focus, and an aperture of $\frac{3}{4}$ -in., in the summer sunshine, about two minutes and a half to three minutes. After the plate has been exposed the necessary time, the brass cap is replaced, and the dark frame containing the collodion plate removed from the camera, taking care to close the wood shutter ; they are then ready for the next process—

DEVELOPING,

which may be done at once, or deferred several days, if required. The best solution for this purpose is a mixture of gallic acid and nitrate of silver ; take—

Gallic acid 3 drachms.

Distilled water 12 ounces.

Put this into a stoppered bottle, and shake the whole well up ; let it stand a few hours in a warm room or before the fire, in order to dissolve as much acid as possible, but there will always remain with the above proportions a small quantity undissolved at the bottom of the bottle : to this add—

Alcohol 1 ounce.

Glacial acetic acid ... $\frac{1}{2}$,

Just previous to commencing the development of the picture, pour about $\frac{1}{2}$ an oz. of the gallic acid solution into a *clean* measure, at the same time filtering it through filtering paper.

The plate, on being removed from the camera slide or dark box in the operating room, should be placed face upwards on a levelling stand, and a small quantity of distilled water poured over the surface, letting it remain there several minutes, in order to moisten the film previous to commencing the development. Many operators just re-dip the plate into the aceto-nitrate bath for two or three minutes instead ; this perhaps is

more convenient, and effects the same purpose; moreover, the addition of the nitrate of silver assists the development: but whichever method is adopted, after the albumen film has been softened the gallic acid solution should be poured over the surface, and allowed to remain there two or three minutes, when a slight trace of the picture will be seen. At this stage of the process the picture must be drained of the developing solution and held up to the light; by this means, on looking through the plate you will observe if any stains have made their appearance. Should this be the case, they may be removed by taking a small piece of cotton wool and carefully wiping the albumen surface, then wash the plate with a gentle stream of soft water, and apply the developing solution again; but this time about twelve or fifteen drops of the bath solution should be added to the gallic acid. In a short time the plate will have acquired the requisite amount of density, when the further development is stopped by washing with a stream of pure water.

The plate should now be again thoroughly examined, and if any stains are visible they possibly may be removed by wiping the surface with a piece of *clean* cotton wool, and afterwards well washing with more water. The time requisite for development will vary very considerably, depending on the amount of exposure the plate has had; but as a general rule from twenty minutes to half an hour will be sufficient. I have found

that over-exposed plates have given better results than those which have not been sufficiently illuminated : the appearance of the negative will determine this point. Perhaps the most simple method will be, before starting on a tour, to expose a plate in a moderate light, say two minutes, and develope it: then expose another in the same camera immediately afterwards, allowing four minutes. The comparison between the two will afford the experience necessary. When the developing solution on the plate turns thick before the plate is finished, it must be thrown away and more mixed, *previously washing the measure which contains it*, and on no account return the developer that has been used on the plate to the fresh solution ; the value of the gallic acid solution is so very trivial that it should be used freely, but always filter it immediately before using. Instead of placing the plate on the levelling stand to develope it may be laid in a shallow glass pan and the solution poured over it, but I do not recommend this, as the dirty solution is not so readily removed as by the former method.

FIXING SOLUTION.

In a wide-mouthed bottle dissolve :—

Hypo-sulphite of soda... 5 ounces.

Soft water 1 pint.

The plate should be either laid in a porcelain pan, face upwards, and covered with the above solution, or placed on the levelling stand, and the fixing solution poured

over it until the semi-opaque yellow film is removed, which will be the case in a few minutes, when the process of washing must be again carefully performed; should the hypo-sulphite of soda not be removed, the crystals formed on drying will quickly spoil the same from being of any further use. To insure freedom from this salt, it will be better to hold the picture under a small tap of running water in preference to immersing it in a pan or vessel of water. It must then be stood on end to drain and dry, to assist which it will be advisable to rest the bottom edge on a few thicknesses of blotting paper, or it may be hastily dried over a spirit lamp or before the fire; as a further precaution the hands should be washed with soap and water to free them from the hypo-sulphite, else the next picture may suffer from the neglect. When the plate is thoroughly dry it will require to be varnished to protect it from injury whilst printing.

The hardest varnish, and most durable for negatives, is amber dissolved in chloroform; this is to be poured on the centre of the plate in the same manner as recommended for collodion at page 20, returning the superfluous quantity into the bottle, again using precaution to prevent particles of dust from settling on the surface. This varnish will dry in a minute or two, when the picture is finished, and may be used for the production of paper or glass positives in any number, by the method described in the following pages.

Printing Process.

The term printing means the formation of positive copies from the negative previously obtained. In order to render this more intelligible, it will be advisable to describe the difference between negatives and positives.

A negative picture is one that has the lights and shades reversed, that is to say, if you hold it up to the light and look through it at the sky, you will find that those objects which were white in the landscape are perfectly black or opaque in the picture, while black or dark subjects are transparent; by laying the plate on a piece of black velvet the details present an uneven and confused appearance, while with a positive picture the lights and shades are shown correctly. It should be remembered that the pictures taken in the camera by the dry process are all negatives, consequently useless until the positive has been obtained from them.

Positives may be printed on paper or glass; if they are intended for stereoscopic pictures, better results will be obtained by printing on the glass, producing what are generally termed "transparent pictures." This method is also applicable for taking magic lantern sliders. Paper pictures are likewise taken from the

glass negative, and possess the advantage of more easy carriage, and are less liable to be damaged by accident. I will, therefore, give the directions for both processes, leaving the choice to the operator.

PRINTING TRANSPARENCIES, FOR STEREOSCOPIC OR MAGIC LANTERN PICTURES.

The only additional apparatus required for this purpose is a pressure frame, as described at *fig. 15.* You take a glass and clean the surface, then coat it with collodion and albumen, the same as for the production of negatives; when the plate has been made sensitive, take the pressure frame into the dark room and remove the jointed back-board, wipe out the dust that may have settled on the glass plate, and lay the negative on the same with the prepared side *upwards*; then on this lay the prepared glass, with the albumen side *downwards*, so that the two surfaces touch each other; it will be advisable over this to put a layer or two of soft paper or flannel to prevent breakage previous to replacing the back-board, but next the prepared glass place a black paper or card, then close the arms which carry the springs, and cover the whole with a dark cloth, carry the frame into the open air and remove the cloth, exposing the frame to the action of the light, when the picture will be impressed on the sensitive plate. The exposure required will be about six to eight seconds in the shade, remembering that the glare of the sun would be far too powerful for this purpose;

when the time of exposure has elapsed, wrap the whole again in the cloth and return to the operating room where the plate is to be removed from the frame, and develope the picture in the same manner as described for negatives, it is afterwards to be washed and fixed, when it is ready for mounting, either as a transparent stereoscopic picture or for use in the magic lantern. Should it be thought desirable, the operation of printing may be performed by gas-light, or with the light given by a moderateur lamp; in this instance the time of exposure will have to be increased to about five or six minutes; the pressure frame should be held as close as possible to the light so as to thoroughly illuminate the whole surface. In printing on glass care must be taken not to rub the two surfaces against each other, but lay them gently but firmly down, and on this the board of the frame; it is indispensable that the interior of the board be covered with black cloth, or card, else the reflection from a light surface will impair the sharpness of the copy.

PRINTING ON ALBUMENIZED PAPER.

The plan of proceeding most generally adopted has been to saturate a sheet of paper with a solution of an alkaline salt, allowing it to dry, and subsequently floating it on a solution of nitrate of silver, by which means the surface of the paper becomes covered with a chloride of that metal.

The apparatus necessary for this purpose consists of a shallow glass pan, two or three porcelain pans, a glass rod, pressure frame, and albumenized paper; as the preparation of albumenized paper is a matter of some difficulty, and is seldom produced by the amateur so perfect as by those who devote their time to its manufacture, I should recommend that it be purchased ready for use rather than incur the risk of failure in future operations.

Previous to commencing, cut the papers into the size required, leaving a margin of about half an inch over the size of the negative, and mark with a pencil in one corner the prepared surface so as readily to distinguish it in the dull light of the operating room: the proper side will be readily known by its having a high gloss on the surface, it then should be examined, and only those sheets retained that have an even coating free from spots or smears; the paper in this state is unaltered by light, and may be kept any length of time if preserved from damp.

The first operation will be to

EXCITE THE PAPER.

A short time before required for use, it is to be rendered sensitive by floating on a solution of

Nitrate of silver..... 60 grains.

Distilled water 1 ounce.

Mix these thoroughly together and filter it into a glass

pan, so as to have a depth of about half an inch, then in the dark room take the paper, and holding it by the two ends, using both hands ; let it slightly belly or fall in the centre, which must be carefully lowered so as to touch the surface of the silver, then gently lower the two ends until the whole is floating on the surface of the silver solution, by this means the air bubbles which may form underneath the paper are expelled. The paper will require to remain on the solution about three minutes, or from that to four or five minutes, to thoroughly saturate the coating of albumen, when the corner is to be gently lifted with a pair of wood or horn forceps, and the sheet hung up in the dark to dry ; should a pair of forceps not be at hand, a piece of clean wood may be used for the purpose, and after it has been raised, a corner of the paper may be taken between the fingers, and pinned on to a line to dry ; to facilitate the drying, attach a small portion of filtering or bibulous paper to the bottom corner of the sheet, which will rapidly absorb the moisture. All this, and the following preparation, should be done in a dark room, or by the light of a candle, as the paper now is sensitive to the action of white light. The silver will be found to discolor by the action of the albumen ; to prevent any injurious effects from this cause, after having prepared about half a dozen papers, return the solution into the bottle, and add to it about a quarter of an ounce of kaolin, shake the whole well up, and after

it has had time to subside, filter it again for use into the glass pan. I recommend glass pans for the silver solution, as porcelain absorbs to a greater extent the chemicals that are used in them. When the paper is thoroughly dry, we may immediately, or, if more convenient, delay for a day or two the next process, which is

PRINTING THE POSITIVE.

The negative is to be laid face upwards on the glass of the pressure frame, and the paper albumen side downwards over it, bringing the whole into close contact with the pressure board, then close the cross bars or arms and remove the whole into the daylight, turn the frame face upwards, and expose it if possible in the full direct light of the sun; if this is not practicable, as is often the case in winter, let it stand in as bright a light as possible; the time of exposure will be, with a bright sunshine, about five to ten minutes, or according to the light, up to three or four hours; but the correct time may readily be determined by examining the progress of the paper during the process, by removing the pressure frame into the operating room and unfastening one of the cross bars, and lifting the half of the back board which is jointed for the purpose, the proof will be seen; this should be allowed to attain a colour several shades darker than it is intended to remain, as it loses its depth considerably in the next process, which is

FIXING AND TONING.

There have been various methods in use for the security of the permanence of the finished picture, as well as the production of a pleasant tone or shade; after some years constant practice I have found the following to be far the most certain and permanent method which I have tried:—

On removing the print from the pressure frame, if properly exposed as before described, it will present a dull red unpleasant colour, and the whites will be darkened to a light buff shade, but which will afterwards be removed, when the finished picture will present a natural appearance.

The first operation will be to wash the paper under a stream of running water for a few minutes, in order to remove the crystals of silver that are formed on the surface: then prepare the fixing bath, by dissolving—

Hypo-sulphite of soda... 6 ounces.

Soft Water 1 pint.

Filter this into a porcelain pan, and thoroughly immerse the wet paper picture into it: the dark colour will rapidly disappear. When it has reached the proper depth, or the whites are pure, it should be removed and plunged into the toning bath, prepared by dissolving in a porcelain pan—

Hypo-sulphite of soda ... 4 ounces.

Soft Water 12 ,,

And in another vessel the GOLD SOLUTION, which is made by dissolving—

Chloride of gold 4 grains.

Distilled Water 1 ounce.

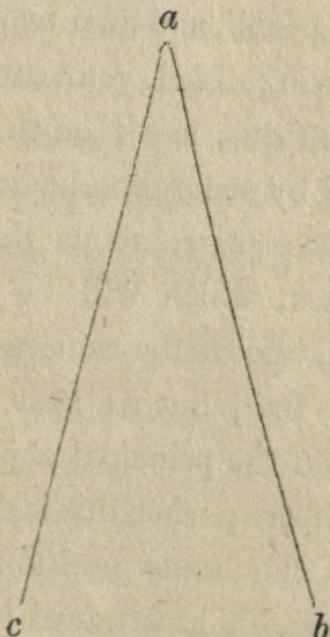
Mix them slowly, one drop at a time, carefully stirring it with a glass rod,—it afterwards should be filtered. The *gold solution must be poured into the Hypo-sulphite of soda solution*, and then carefully filtered into another shallow pan, and the picture immersed into this, when the colour of the print will change from red to black ; as soon as the desired tint is obtained, remove the picture and well wash it with running water for several minutes, and, as a further precaution, let it remain soaking for half an hour in clean water, frequently changed ; by this means the hypo-sulphite of soda will be completely removed, and the picture may be considered finished.

The toning bath will become impoverished by use after working some time ; if the prints do not colour readily, add a few drops of the gold solution, which will accelerate its action.

The readiest way of mounting paper positives is to make a strong solution of gum arabic, with *hot* water, and gum the print on a clean white card, leaving it under a moderate pressure for several hours ; afterwards revive the surface of the paper by passing a moderate warm iron over it.

Stereoscopic Pictures.

The Stereoscope affords to the photographer the means of producing, with a small apparatus, effects, which otherwise would involve the necessity of a cumbersome camera, and the increased difficulty resulting from the employment of large plates. The picture for the stereoscope consist of two views of the same object, taken from different points of sight, as will be illustrated by the following diagram:



Let *a* represent an object which is required to be photographed ; you place your camera at a convenient distance from it, say in the position marked *b*, and obtain

an impression on the sensitive plate : then remove the camera to the left, in the position marked *c*, and take another picture. When these are mounted, and viewed by the stereoscope, they will appear to stand in relief or convey the impression of solidity.

For landscapes, buildings, and still life, where there is not a likelihood of the object shifting its position, the ordinary view camera may be used, but I should not recommend it, unless on an emergency ; however, as it is sometimes desirable to have the means of obtaining a stereoscopic picture when a stereoscopic camera may not be ready at hand, a few details will render it practicable.

First rule on the ground glass of the camera several vertical lines with a pencil, and then two or three horizontal across them ; having fixed your camera on the stand and obtained the focus, mark on the ground glass the position occupied by some prominent object : then take a picture on a glass plate, about the size of half the stereoscopic plates, which will be $3\frac{1}{4}$ -in. by $2\frac{3}{4}$ -in. ; having done this, remove the camera to another position, to the left of the first, but as near as possible at the same distance from the principal object in the view, and again obtain the focus ; when this is done observe that the picture occupies the same position on the focussing screen, which is readily ascertained by means of the pencil mark previously made, should it not do so, a slight movement of the camera will rectify it : you will here again take a photograph of the view, which will require

to be mounted by the side of the one previously taken, for use in the stereoscope : but the picture taken first or in the position of *b* must be mounted on the card to the left of the other, or in a reversed position, else the stereoscopic effect is not produced. The distance between the two positions is not a matter of so much importance as may be supposed. I should recommend that the two points of sight be not separated more than two feet for every hundred feet distance from the principal object.

For convenience, the stereoscopic camera mounted on parallel laths, with a sliding back, is recommended. It consists of an ordinary camera mounted on two bars, which allow it to be rapidly moved from right to left, without disturbing the position of the image upon the glass, and at the back of the camera is an oblong frame to carry a glass large enough to hold both pictures : this frame also slides from right to left, in a groove, so as to bring the opposite ends of the glass plate at different times before the lens.

One end of these bars or parallel laths is fixed to the bottom of the camera, while the opposite ends are pinned to the bottom board or table, but are capable of being moved by a double screw, so as to bring them closer together or separate them, if required, so as to suit objects at different distances. This arrangement is suitable for portraits as well as views.

To take a stereoscopic picture with this description of camera, you first (having fixed your camera on the stand)

move the camera on the bars to the extreme right hand side, and focus for the view, marking the position of the objects as before directed ; then slide the camera to the left and observe if the view or picture retains its same position on the focussing glass ; should it not do so, alter the position of the parallel bars by turning the screw attached to them. It will be found that there is a point at which the image will remain fixed, or stationary, on the ground glass, while the camera is moved to and fro. Now again place the camera on the right hand side, and insert a plate holder containing the prepared glass : remove the brass cap which covers the lens, and give it the necessary exposure. Replace the brass cap on the lens, and slide the camera *to the left*, also slide the plate holder containing the plate *to the left* : remove the cap again, and expose the plate for the other picture, after which it is ready for development.

In using the Tourist's Camera, *Fig. 2*, care must be taken to close the dark slides or shutters in removing the plate holder from the camera ; also remember that the plate holder must be moved from right to left, *or in the same direction as the camera*.

General Directions.

1st.—In cleaning the glasses which are afterwards to be used for obtaining the picture, especial care must be taken to use a perfectly clean cloth, one that has been washed without soap is preferable ; but if the glasses have been used before, they will require to soak in a weak solution of cyanide of potassium and water, which will dissolve the dried film.

2.—Coat the plate with collodion in a room as free from dust as possible ; also be careful to wipe the neck and stopper of the bottle before use, to prevent particles of dry collodion from flowing over the plate. To prevent the sediment at the bottom of the bottle from being disturbed, use a long bottle, such as described in *Fig. 13*, page 12.

3.—When the aceto-nitrate bath is not in use, it should be kept in a stoppered bottle, out of a strong light. Moderate exposure to daylight will not injure it.

4.—Drying the plate, after coating with albumen, must be carefully performed ; it will be advisable to do this in an open room where there is a good current of air, but free from dust. As the first drying after coating with albumen may be performed in the open daylight, they should have plenty of time allowed, which

will not occasion so much trouble as if it were essential to preserve them in the dark.

5.—After having excited the albumenized plates, do not spare water or trouble in washing them thoroughly ; this precaution has been before remarked, but its repetition may be advisable. When they have been washed, and are perfectly dry, they must be carefully preserved from the light until after they are fixed.

6.—In preparing an operating room, do not have more light than is necessary to perform the operations of exciting, developing, &c. &c. ; about two thicknesses of yellow calico will generally be found sufficient. A candle must not be used unless it is shaded with a yellow screen.

7.—In exposing the plate in the camera, two or three precautions must be taken, or the picture will lose its natural perspective ; the principal cause of this is slanting the camera, which always must for views or landscapes be kept perfectly level or horizontal. The eye is mostly sufficient to insure this, but, as a further caution, many operators use a small spirit level. In photographing architectural subjects, the camera should be placed on as elevated a spot as possible, but should the whole of the building not come into the focus glass, raise the lens by means of the sliding front, which is almost indispensable for landscape cameras ; likewise take care that the direct rays of the sun do not fall on the

lens, or they will strike inside the camera and solarize or confuse the picture.

8.—When you develope the pictures, an estimate may be formed as to the proper time of exposure the plate should have had. If on applying the gallic acid solution the picture does not make its appearance in three or four minutes, add to the developing solution a few drops of the bath solution, and pour this over the plate, let it remain there a minute or two, and then throw it away, and use a *fresh mixture* of gallic acid and silver, previously washing the measure which contains it ; continue this method for twenty minutes or perhaps in cold weather for half an hour, when the picture should be pretty fully developed. If this is not the case, a few drops of pyro-gallic acid solution, (made with 2 grains of acid to an ounce of distilled water) may be added to the gallic acid, and the shadows will rapidly darken to the extent required. Should the picture not present the proper contrast of light and shade, which is requisite for the printing process, but is of a uniform dull colour, the sky being too transparent, and the details are indistinct, the time of exposure in the camera has been too long ; but in an under-exposed plate the sky is very dark and opaque, while the dark parts of the picture are entirely without detail, and in the printing process will only produce blacks and whites, without half-tones.

9.—Blisters and marks in the film are to be especially

guarded against ; I have found the plate to blister from three causes. First—After coating the glass with collodion, not allowing sufficient time for the film to set before immersing it in the nitrate of silver bath. Secondly—From the albumen not having been evenly poured over the plate. If the albumen is made in the proportions given at page 23, it may, to a beginner, be found difficult to float it uniformly over the surface, but to remedy this, it may be diluted with half an ounce of distilled water, which should be added previous to its being filtered ; the water will also assist its filtration, but when a thin albumen like this is used, it should be poured over the plate several times in order to get a sufficiently thick coating, returning the superfluous quantity into the large end of the filter, *Fig. 11*, but the albumen after having been poured over several times will become too thin to use, and must be thrown away. It will be observed that in this particular there is a very great latitude allowed in the quantity of water which may be added to thin the solution. Another cause, and the most general, is not drying the plate either sufficiently or carefully. The glass must be stood on end, the bottom side resting on blotting paper, which will absorb the moisture, whilst the top edge must rest against the wall, touching it at *only one corner*. The reason for this is that if the plate touches all along the top, the moisture is drawn up by capillary attraction, and the surface dries unevenly.

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8 , 6 ,	0 12 6	0 15 0
8 $\frac{1}{2}$, 6 $\frac{1}{2}$,	0 13 4	0 17 0
9 , 7 ,	0 17 0	1 1 0
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8 $\frac{1}{2}$, 6 $\frac{1}{2}$, to hold six plates	0 7 0
9 , 7 , , , , , , , , , , , ,	0 8 0
10 , 8 , , , , , , , , , , , ,	0 8 6
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